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REPORT

OF THE

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FEB 26 1931
UNIVERSITY OF ILLINOIS.

BOARD OF REGENTS

COLLEGE of HAWAII

TO THE

LEGISLATURE

IN ACCORDANCE WITH ACT 24, 1907

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THE LIBRARY OF THE
FEB 26 1931
UNIVERSITY OF ILLINOIS

Report of College of Hawaii.

To the Legislature of the Territory of Hawaii.

In compliance with Act 24 of the Session Laws of 1907, the Board of Regents of the College of Hawaii hereby transmit the report of the President of the Faculty showing financial statement and exhibits, together with the recommendations for appropriations for the coming biennial period.

Respectfully submitted,

HENRY E. COOPER,
President, Board of Regents.

Honolulu, T. H., February 17, 1909.

THE COLLEGE OF HAWAII—ITS WORK AND NEEDS WITH FINANCIAL STATEMENT AND EXHIBITS.

In pursuance of an Act of the Legislature in 1907, the College of Hawaii has been established in accordance with the provisions of the Land Grant Act of 1862 providing for the establishment of Colleges of Agriculture and Mechanic Arts in all the states and territories.

The College, as at present organized, offers four courses of College grade leading to the Bachelors degree; namely, courses in Agriculture, Engineering (Mechanical, Electrical and Civil), Household Economics and General Science.

In addition to these, instruction is offered in certain groups of studies, such as crop production, hydraulics, sugar chemistry, bacteriology, animal husbandry, and the like, to students desiring specific knowledge in such subjects, and not wishing to study for a degree. All these courses require the completion of a good high school course such as is given in Oahu College or the Honolulu High School, and a certificate in certain special subjects for entrance. As an extension feature the College offers afternoon and evening lectures in Agriculture Home economies and other subjects of public interest.

The subjects of which these courses are comprised, and the methods of teaching are designed to give a liberal education and primarily to promote intellectual training in the various pursuits and professions of life, and this free of tuition. The College is this year giving instruction to six regular students, five preparatory students, twenty-two special students, and to sixty-four students taking lectures and practice work in subjects especially provided for them.

The College derives its support from both the Federal and Territorial governments. The Morrill Act of 1890 and the Nelson amendment of 1907, both of the Federal Congress, appropriates this year (07-08) \$35,000. This sum will be augmented each year by \$5000 until the aggregate shall become \$50,000. This sum can be spent only for specified purposes; namely, for the payment of salaries, and for the purchase of apparatus, books and illustrative material for teaching specified subjects under the general heads of Agriculture, Mechanic Arts, English Language, Mathematical Sciences, Natural and Physical Sciences and in the Economic Sciences.

In accepting these Federal grants the Territory also accepts the obligation to provide the necessary lands, buildings, administration and for the teaching of those subjects not otherwise provided for.

To meet the needs of the College of Hawaii, in these respects, and for the execution of its various activities the Legislature is respectfully requested to make appropriations for the following purposes:

For the construction of a new building completed on the tract in Manoa valley. This building is designed to house the departments of Agriculture, Engineering, Household Economics and General Science, including space for the library and an auditorium. (See plans.)

In order to meet these requirements the building should cover 20,000 square feet of ground area over all dimensions and comprise 900,000 cubic feet of space including walls. It is designed to make the building comprise two main stories with a useable basement and attic. It is desired that the building shall be built of permanent building materials, either quarry stone or reinforced concrete, or of these two materials combined, and also to be constructed in a style of architecture that will be conservative and pleasing in its appearance, preferably of some classic type.

In estimating the space required in this building it should be remembered that to provide for the diverse activities of Agri-

culture, Engineering, and Household Economics, requires more room per student working than for the activities of a classical college. In order to build this building as indicated, it is estimated that it will cost 22.22 cents per cubic foot. Fifteen hundred of this amount should be used for the immediate construction of a wooden building on our present grounds to house the equipment and machinery for the Department of Engineering. We have advertised courses in the Department of Engineering that require this equipment and the equipment is being purchased from available Federal funds to the extent of about \$10,000. At the present time there is no place in which to set up this equipment and render it available for use. At the same time I feel that this is of paramount importance, for having advertised the courses and having students to take them, we lay ourselves under obligations to offer them, and no better inducement could be set forth to attract the attention of our young citizens to the facilities of the College to offer the instruction that they demand, than well equipped laboratories and machine shops.

Sufficient funds are required for the manufacture and purchase of the necessary furniture and equipment for the new building. That is, for the purchase of cases, shelving, laboratory tables, desks, benches, chairs and all necessary class room furniture and fixtures. The sum provided may only partially furnish the new building, forming the equipment necessary for a few years. As the building comes into greater use by the increase in numbers of students other furniture and equipment will have to be purchased.

Five thousand dollars for incidental expenses for the two years ending June 30, 1911, pertaining to grading, scaping, planting and cultivating the grounds with the necessary water and sewer connections and other incidental expenditures and purchases.

Fifteen thousand dollars for salaries for the biennial period. This amount is based on our present expenditure for this purpose, with the additional provision for professorships in English and History, which will be required during the next two years. In contrast with this amount for salaries it should be noted that during the two years nearly \$48,000 will be required for salaries from Federal funds.

On page nine (bottom of page) of supplementary report by the Committee appointed by the Legislature in 1905 and submitted May 25, 1905, is this statement:

"We would also recommend that the President (Board of Regents) and the Governor be asked to set aside a portion of

the public lands of the Territory, which shall yield an annual income of not less than \$25,000, said income to be expended for the benefit of the institution under the direction of the Board of Trustees.

This is an important provision and it is strongly recommended that it be given consideration. If the work of the College is to be recognized as permanent some form of permanent endowment should be provided, lest at some time important work should be interrupted for lack of appropriations.

In order to show the amounts of land in the grounds and farms of similar Colleges on the mainland, and also to show the relative amounts of appropriations from both State and Federal sources, attention is called to the table appended.

This aggregate amount of appropriations may seem quite excessive when all of the other needs for money are considered in connection with the present shortages, but it is the duty of the College to present its actual needs in accordance with the conditions for its growth and the importance of the work of the College in the Territory.

Moreover it should be remembered that during the next ten years the available Federal funds will amount to \$485,000. Whether this sum can be spent will depend largely on the position that the Territory takes towards the purchase of the required amount of land and the construction of the necessary buildings to afford the College the opportunities for growth and development that the conditions in the islands demand.

It is very desirable to have the growth and development of the College take place in accordance with the definite plan that shall be adopted in order that the first building may take its place in this plan. (See plan.) It will be a splendid outlook for the College if this first building may be of the materials and architecture according to the actual needs of the College and in the construction of it that it may be looked upon as a part of the whole rather than as a complete unit in itself. If the College is forced to get along with a smaller appropriation for buildings and equipment this may materially modify the outlook for the development of the plan contemplated, as it will no doubt necessitate the building of some of the smaller buildings, or a part of the larger building, that would be to the disadvantage of the final plan. It may be definitely stated and without contradiction that although the first cost seems large, yet the ultimate gain in constructing as indicated above will be a large benefit and saving to the College and Territory.

In order to properly house and equip the divers activities in

which the College is engaged, in one building, it requires more room per student working in that building than if the activities in the building were more unified.

It may be rightfully asked what is the relation that the College bears to the activities of our Territory, or, in other words, what returns may be expected from the College in the general uplift and betterment of the conditions?

In this connection it is pertinent to note that in no part of the world are there more important questions awaiting solution in the fields of agriculture and engineering, taken in their broadest sense than in Hawaii. On the mainland the value of agriculture productions has increased from a little over two billion dollars in 1880, to more than seven and one-half billion in 1908. Quite a large part of this increase is traceable directly to the propaganda of various States and the Department of Agriculture at Washington in agriculture education. Comparatively very little of this influence has been felt in these islands, largely, because the teaching and experimentation of the various colleges and experiment stations have related to temperate conditions.

It is the province of this College to foster and propagate teaching and investigations that shall pertain to the agriculture of the tropics. As an instance of the value of this kind of work, the Sugar Planters' Experiment Station may be cited. This institution has promoted teaching as well as investigation and the results of its work in the importance of cane culture and field and factory methods in sugar production has paid many times over for the cost of maintaining the institution.

Large fields for teaching and research are opening up in respect to our new industries, such as pineapples, rubber, coffee and other activities. At the present time from 200 to 400 pounds of sugar is added to each ton of pineapples in canning. When it is remembered that during the past fifty years the sugar beet has been improved in sugar content about 100 per cent it does not seem improbable that the pineapple holds out the same inducements, for its improvement in sugar content, acidity and dry matter, as does the sugar beet.

This improvement, however, must be accomplished by those who are thoroughly conversant with the physiology and nutrition of plants, mathematics, agronomy and soil management. It cannot be accomplished in a haphazard method.

The problems of soil fertility in these islands are presenting themselves for consideration and they are entirely worthy of it. The time was when it was believed that the chemist could, by

an analysis of the soil and the crop, determine all the necessary phases of the management of that soil. It is now recognized, however, that the crop producing power of any soil depends on a number of factors such as chemical composition, physical condition and drainage, organic matter content and water holding capacity and the bacterial life that exists in the soil. All of these facts are essential in a study of the crop producing power of the soil and the dominance of one factor over another depends very largely on the particular type and formation of the soil and the crop grown.

As years go by, more and more attention must be paid to the various activities and methods necessary to keep our soils up to the high standard of production. Much attention is being given to the conservation of our timber, mineral and water resources, but of no less importance than this is the conservation of the resources in our agricultural soils; indeed, it would appear that the question of maintaining soil fertility is the greatest question that is before the American people today, for the value of agriculture products is more than four times the value of all of our mines, and is greater in value than all of our other products of mining and manufacturing combined.

The continuous production of one crop on the same soil has in all instances, led to the depletion of that soil in producing power, and even where chemical fertilizers have been added, for such fertilizers do not add organic matter to the soil to any appreciable extent, nor do they improve the water holding capacity of a soil, or its physical condition.

The field of animal husbandry is also replete with subjects for teaching. Men of experience say that milk cannot be produced here at ten cents per quart, with profit. In the New England states it can be produced on the farm for three cents per quart. Intelligent feeding and breeding will do much to lessen the cost. Our Territory should also produce beef, mutton, poultry products and draft animals sufficient for its needs, and the question of how to do it is one of the factors in its accomplishment.

New information in all these and other subjects is being obtained by research and experimentation, and it is the province of the College to instruct in these lines of knowledge.

In the field of engineering the problems are of no less importance and magnitude. The questions surrounding the properties and the uses of water in accordance with our soils and cropping conditions are among the most important engineering problems that we shall have to deal with. The actual duty of

water in the growing of any of our crops and on our various soils is not known. In some parts of the islands water is too abundant for the high crop yields, in other parts it is too scarce, and the questions of improving these conditions and conserving the water where it is scarcest are problems that the engineer will be brought more intimately to face in the future.

The data that has been accumulated respecting the use and handling of water for irrigation purposes on the mainland does not apply here, for in the first place, our conditions for evaporation are different, and in the second place our soils are not like those of the mainland, either in type or formation. If the present plans for the development of the College are carried out, no other College west of the Mississippi river will be more adequately equipped for studies and investigations in the properties and uses of water than the College of Hawaii.

In addition to this phase of engineering activity, other problems in the fields of municipal, commercial and manufacturing engineering are indicated and are of importance.

In connection with the relation that the College holds to these activities, it is to be noted that no permanent progress can be made in our large practical field without the aid of science, mathematics and economics in their broad applications. This is an age of industrial achievements and often-times the scientist is lost sight of in our acclamation of the practical man, but it must be understood that the application can never run ahead of the knowledge to be applied, and that the only road to higher achievement in practical things is by the further development of pure science. The main product of science is accurate knowledge and all of our prestige and advancement is based upon this knowledge. The College therefore, in its scope and management, fosters the activities of research and investigation as well as instruction. It is held that these are two inseparable activities of any institution of this nature. While the primary activities of the College may be for teaching, yet in this age of rapid advancement in knowledge, we cannot lose sight of the importance of keeping the knowledge imparted up with the fore-front of achievement.

These points of view pertain particularly to our conditions in Hawaii, and in this connection it is pertinent to return again to the question of providing the necessary and suitable buildings for the propagation of this work. It is urged that in this beginning the College be not hampered for lack of room in which to set forth its equipment and branches of instruction in order to consummate its objects.

FINANCIAL STATEMENT—TERRITORIAL FUNDS.

February 10, 1909.

Buildings and Fixtures—

Amount appropriated.	\$10,000.00
Moving and readjusting old building...	\$3,900.00
Construction of new building.....	4,300.00
Purchase of library shelving, fixtures, etc.	1,086.89
Balance as unspent, June 30, '09*.....	713.11
	<u>10,000.00</u>

Salaries and Pay Roll—

Amount appropriated.	\$10,000.00
For salaries and incidental labor ex-	
penses.	\$3,938.59
Balance as unspent, June 30, '09*.....	3,595.57
Balance on hand for current use.....	2,465.84
	<u>\$10,000.00</u>

Incidentals—

Amount appropriated.	\$ 5,000.00
For purchase of supplies, stationery and	
incidentals.	\$2,839.37
Balance as unspent, June 30, '09*.....	750.00
Balance on hand for current use.....	1,410.63
	<u>\$ 5,000.00</u>

FEDERAL FUNDS.

Amount Appropriated Two Years, 1907-1909, \$65,000.00.

Salaries.....	\$10,027.12
Books and illustrative material.....	5,203.14
Apparatus and supplies	5,779.98
Outstanding contracts, about	12,000.00
Balance on hand	31,989.76
	<u></u>

Total.\$65,000.00

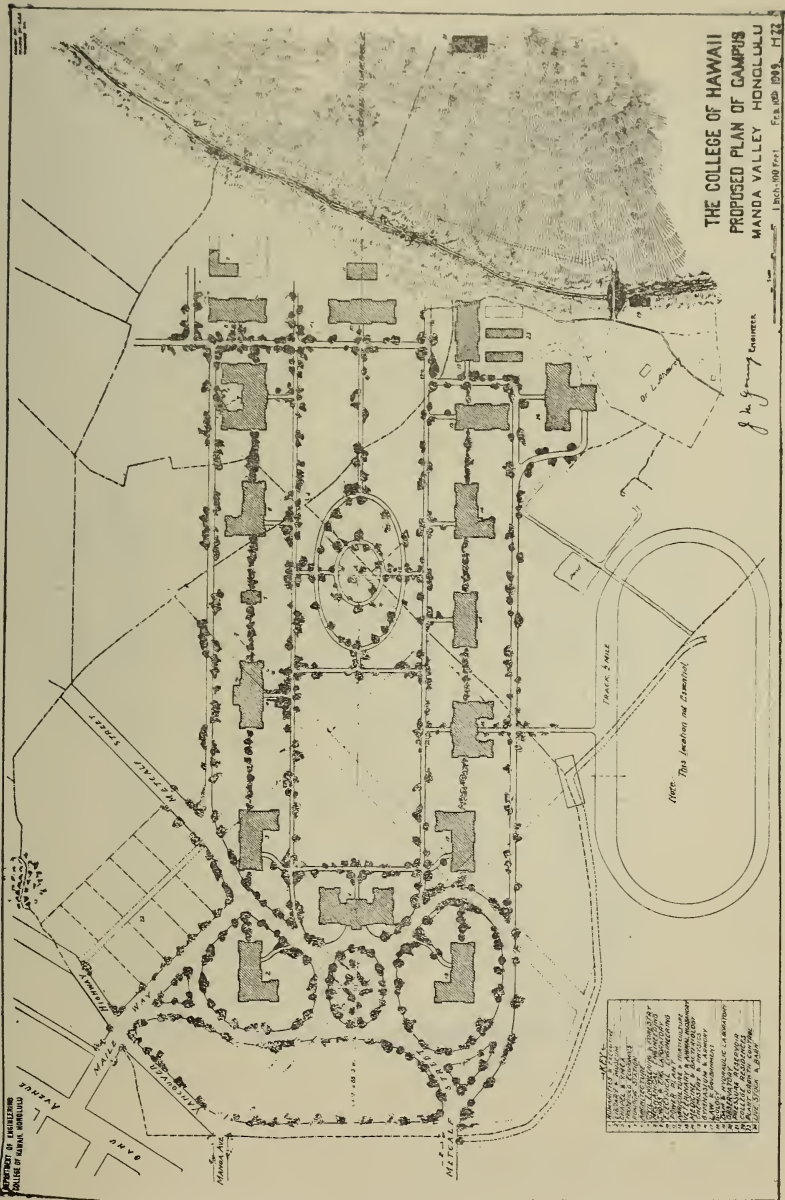
* These items refer to the amount subtracted from the respective appropriations by authority of the Governor in order to meet shortages in other departments. The amounts taken from Incidentals and Buildings and Fixtures are spared with reluctance, for the College is very much in need of these funds.

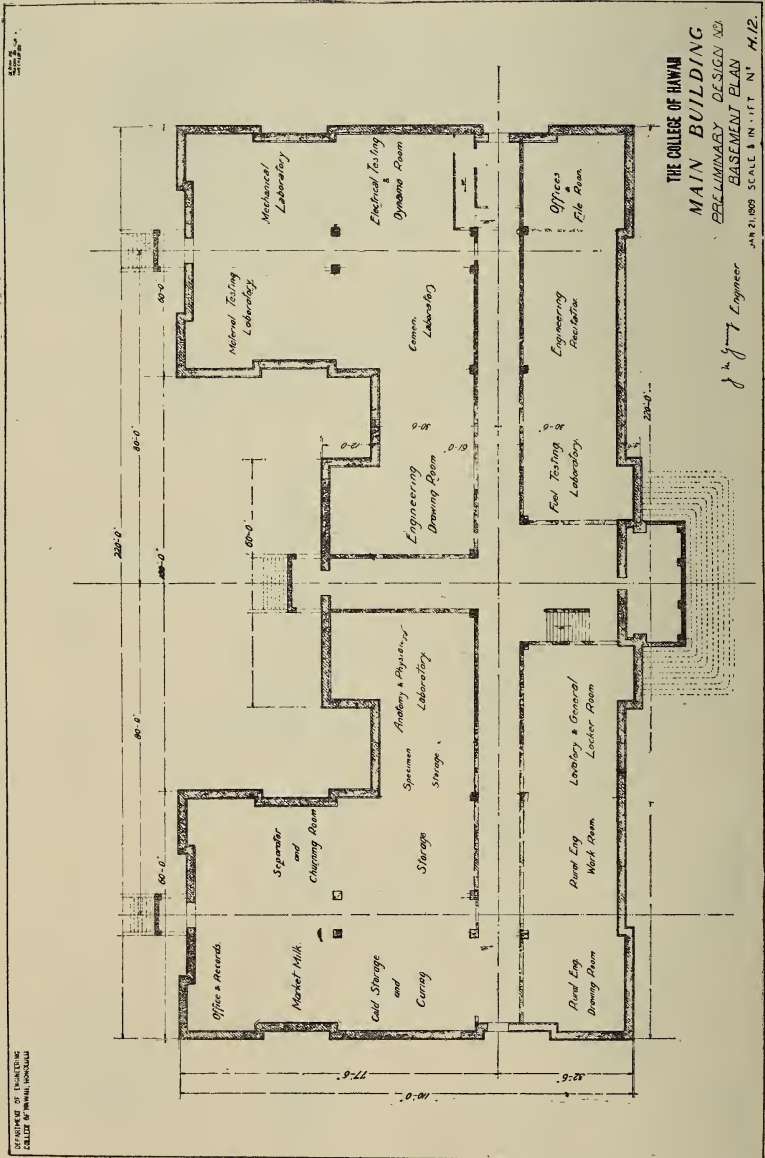
STATISTICS OF LAND GRANT COLLEGES—AVERAGE 5 YEARS, '03-'07.

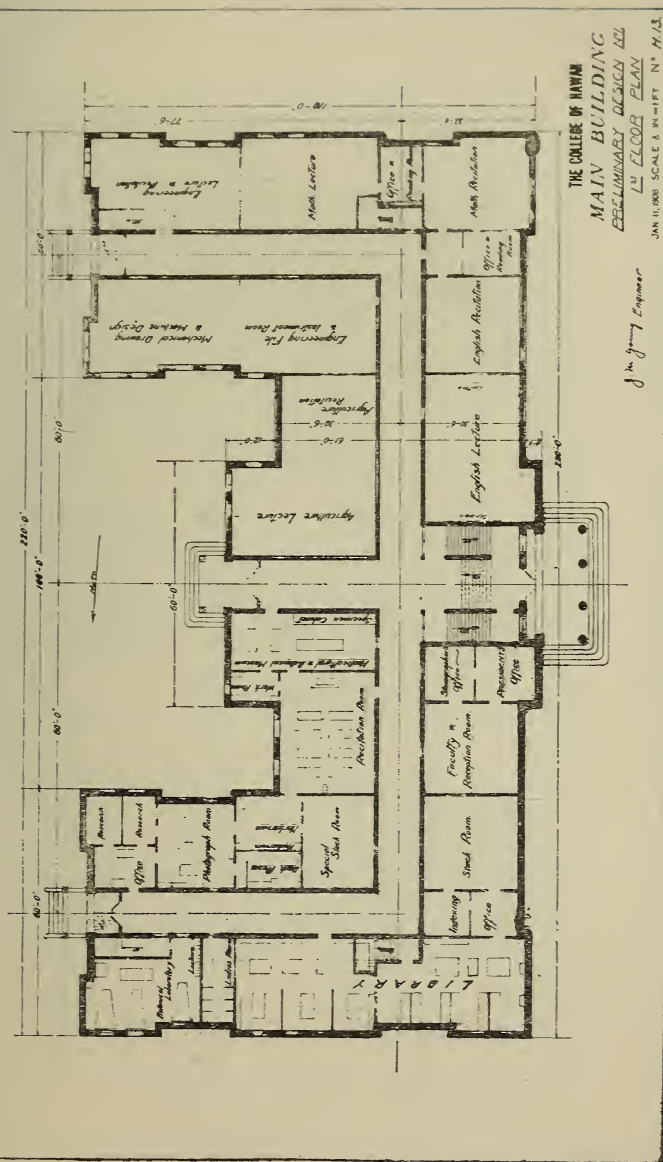
	Federal Appropriation.	Annual State Appropriation.	Annual Miscellaneous Appropriation.	Annual Total Appropriations.	Acres Land Under Grant 1862.	Acres Land in Farm and Grounds.
Alabama	\$25,000	\$ 23,393	\$ 34,151	\$ 82,544	240,000	503
Arizona	41,141	10,329	76,470	496
Arkansas	85,007	35,708	145,715	150,000	175
California	386,871	400,515	812,386	150,000	411
Colorado	64,622	39,520	128,142	90,000	600
Connecticut	34,027	43,733	102,760	180,000	300
Delaware	13,000	18,289	56,289	90,000	113
Florida	22,000	15,422	62,422	90,000	515
Georgia	3,200	23,238	51,438	270,000	873
Idaho	32,485	35,063	92,548	90,000	158
Illinois	499,987	370,276	895,263	480,000	665
Indiana	150,574	109,476	285,050	390,000	189
Iowa	281,328	103,357	409,685	204,000	1,041
Kansas	92,750	68,766	186,516	82,313	430
Kentucky	30,090	53,616	107,706	330,000	568
Louisiana	49,596	39,664	114,260	210,000	768
Maine	27,600	44,953	97,553	210,000	373
Maryland	50,400	49,966	125,366	210,000	402
Massachusetts	75,111	471,418	571,529	360,000	404
Michigan	78,639	174,406	278,045	235,673	684
Minnesota	490,342	271,228	786,570	94,000	300
Mississippi	89,377	96,343	210,720	207,920	2,300
Missouri	280,230	167,635	472,865	277,016	767
Montana	256,000	21,282	102,282	90,000	220
Nebraska	170,091	192,490	387,580	90,000	332
Nevada	30,226	22,627	77,853	90,000	73
New Hampshire	29,977	48,162	103,139	150,000	343
New Jersey	21,554	38,408	84,962	210,000	140

STATISTICS OF LAND GRANT COLLEGES—AVERAGE 5 YEARS, '03-'07.

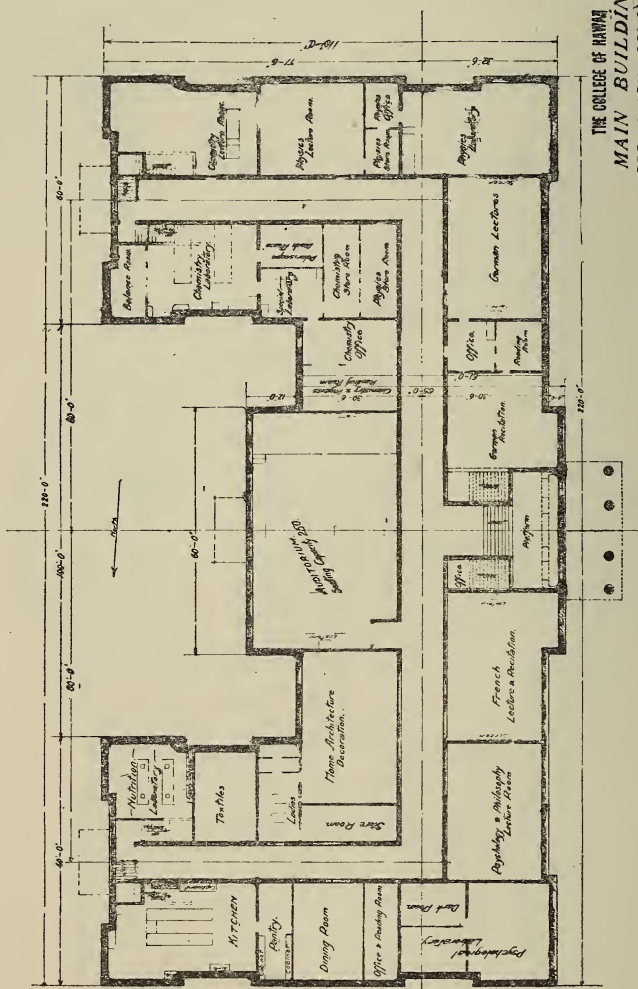
	Federal Appropriation.	Annual State Appropriation.	Annual Miscellaneous Appropriation.	Annual Total Appropriations.	Acres Land Under Grant 1862.	Acres Land in Farm and Grounds.
New Mexico	8,933	10,723	44,656	293
New York	989,920	900
North Carolina	36,250	49,973	110,213	270,000	801
North Dakota	59,047	32,840	116,887	130,000	640
Ohio	260,469	293,840	579,309	630,900	439
Oklahoma	50,626	42,006	97,632	1,160
Oregon	23,080	21,507	68,587	90,000	210
Pennsylvania	91,755	107,077	223,832	780,000	600
Rhode Island	24,827	10,662	60,489	120,000	178
South Carolina	79,558	60,638	154,196	180,000	1,266
South Dakota	37,240	43,639	95,879	160,000	560
Tennessee	17,000	55,138	97,138	300,000	272
Texas	78,477	64,623	168,100	180,000	3,916
Utah	57,216	38,512	120,728	200,000	116
Vermont	28,800	63,829	117,629	150,000	140
Virginia	92,385	230,368	140,753	15,000	1,165
Washington	77,050	42,782	144,832	250
West Virginia	133,799	67,936	226,735	90,000	200
Wisconsin	420,960	274,834	719,794	150,000	500
Wyoming	240,000	416



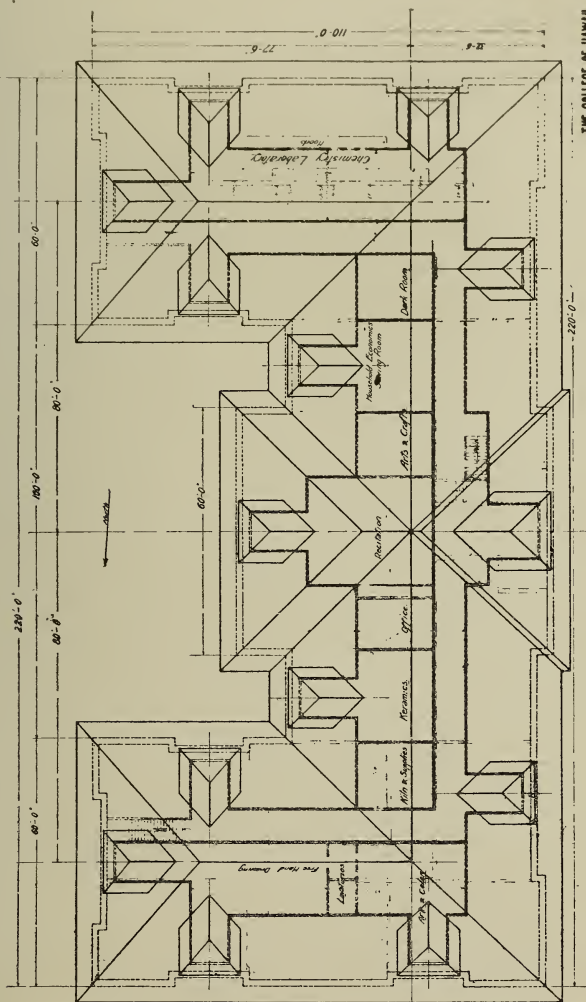




J. H. Young Engineers



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THE COLLEGE OF HAWAII
MAIN BUILDING

J. M. Young Engineer.

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COLLEGE OF HAWAII PUBLICATIONS

COLLEGE RECORDS

No. 6

REPORT

OF THE

BOARD OF REGENTS

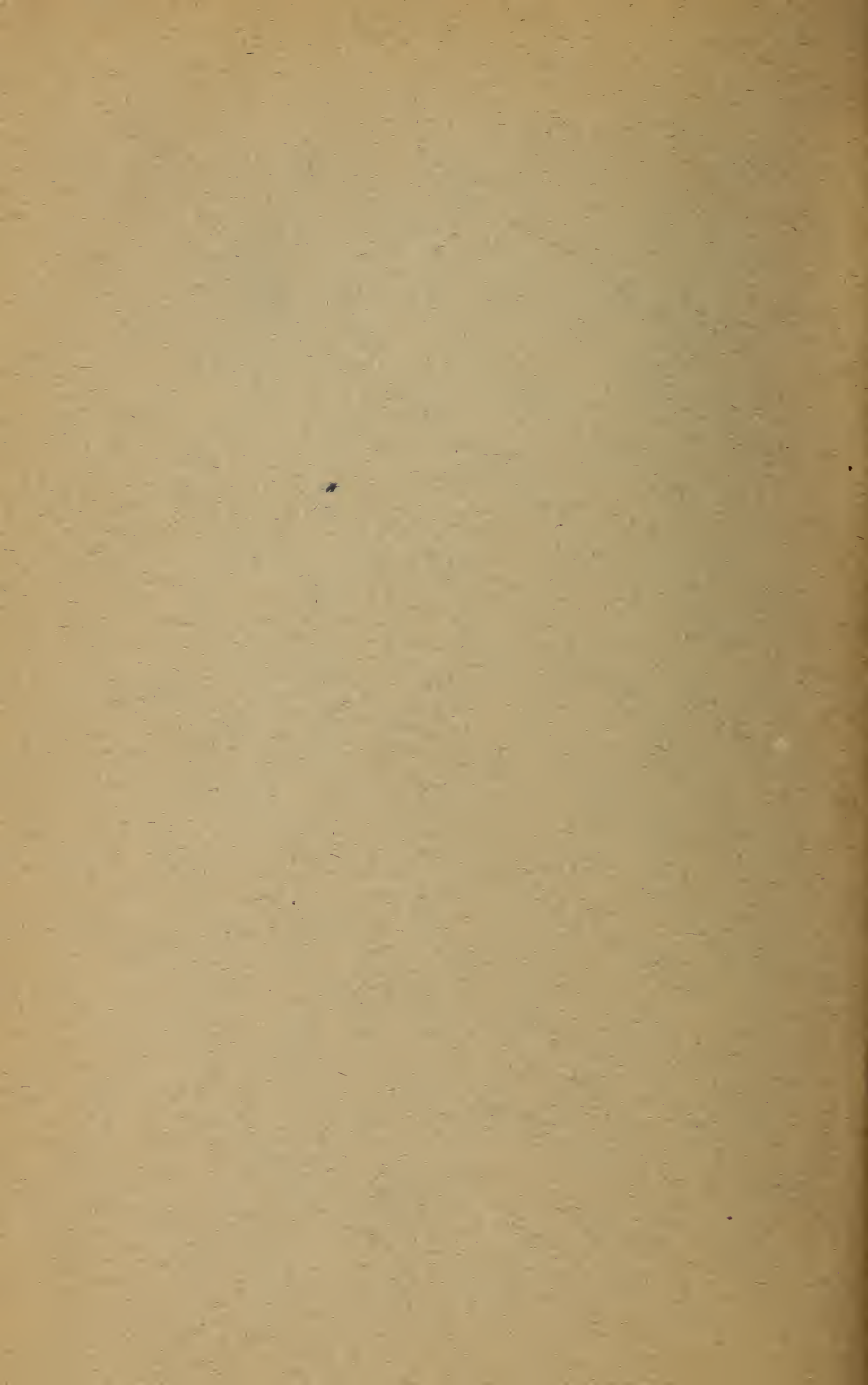
COLLEGE OF HAWAII

1909-II

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HONOLULU:
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FEB. 1911



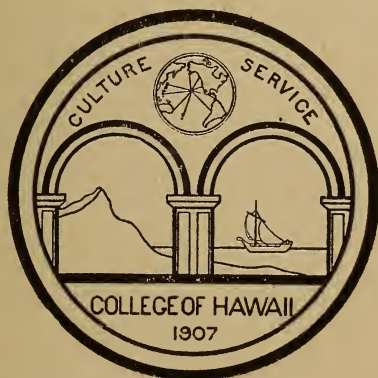
COLLEGE OF HAWAII PUBLICATIONS

COLLEGE RECORDS

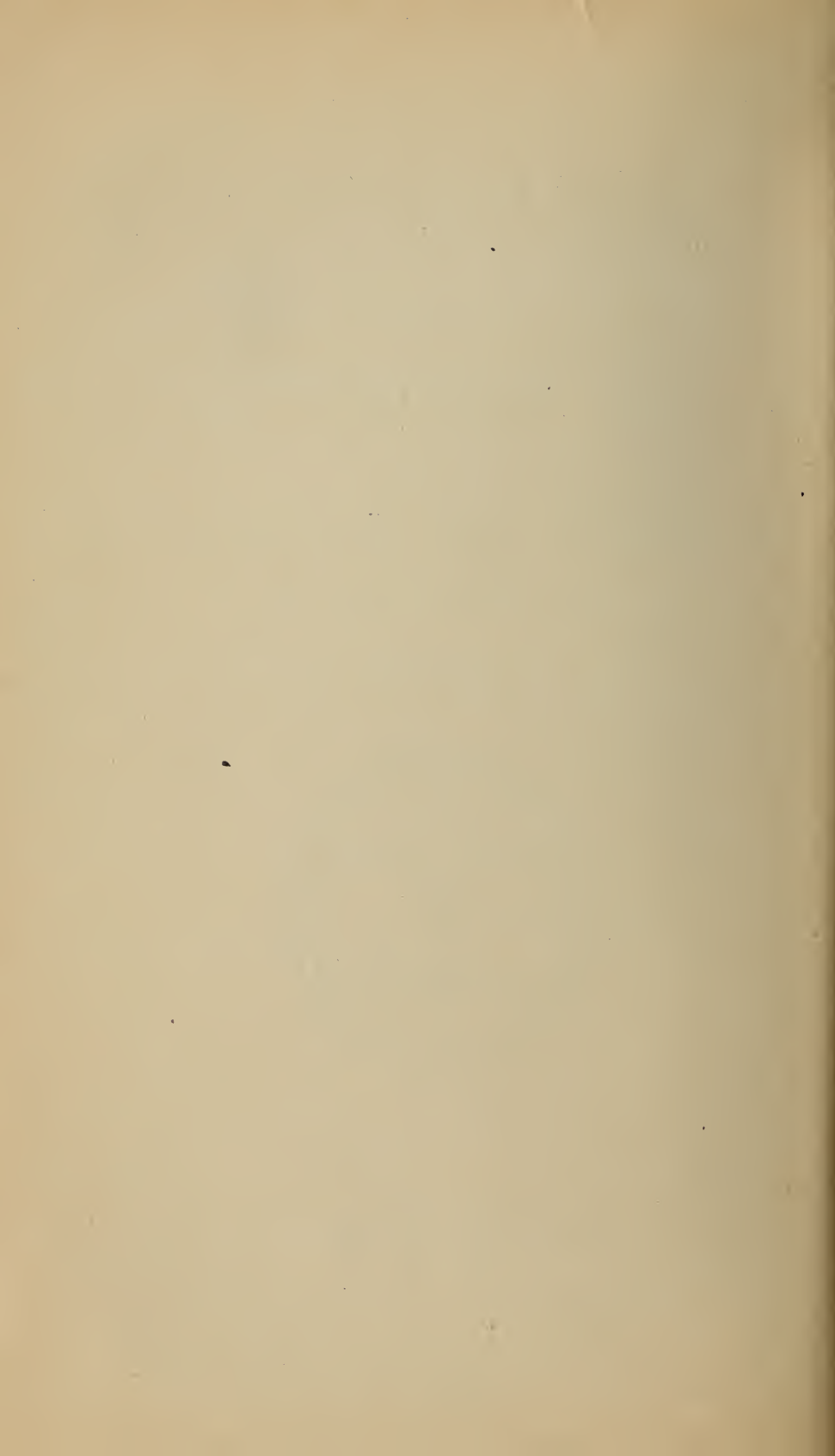
No. 6

REPORT
OF THE
BOARD OF REGENTS
COLLEGE OF HAWAII

1909-II



HONOLULU:
PUBLISHED BY THE COLLEGE
FEB. 1911



REPORT OF

The Board of Regents

College of Hawaii

To the Legislature of the Territory of Hawaii.

In compliance with Act 24 of the Session Laws of 1907, the Board of Regents of the College of Hawaii hereby transmit the report of the President of the Faculty showing financial statement, together with the recommendations for appropriations for the coming biennial period.

Respectfully submitted,

HENRY E. COOPER,

President, Board of Regents.

Honolulu, February 15, 1911.

To the Board of Regents:

I respectfully present herewith my second biennial report of the College of Hawaii, covering the period from July 1, 1909, to July 1st, 1911.

It is a pleasure to have to record two years of steady progress in the work of the College, and to note an enlargement of its activities and an increased interest on the part of both students and the public generally. To such an extent has the College grown both in number of students and varied lines of work that all of the laboratories are now crowded. Most of the Chemistry apparatus and supplies have to be stored under the house. The work in the laboratories for testing materials Domestic Science, Chemistry, Mechanical Drawing, and Botany and Horticulture are utilized to their full capacity.

During the year 1909-1910 sixty-four students attended the College in all of its departments. This is a decrease over the previous year, due to the fact that no afternoon

STUDENTS courses of the short period type were held as during 1908-1909. Of the sixty-four students who attended thirteen were registered in regular courses leading to a degree. The remaining fifty-one took both regular and special subjects to suit their respective requirements.

During the present year 1910-1911, 112 students are in attendance on all courses listed in the College curriculum. Eighteen of these are registered in the regular courses leading to a degree. The remaining 94 are listed as special students taking such subjects as suit their requirements. The College is meeting a larger demand in this respect than heretofore. A number of teachers and others engaged in daily employment coming in for one or more subjects as their time permits. The present year records an increase in students over the previous year of 48, amounting to 75 per cent. This is a testimonial to the interest taken in work of the College. For two years past the principals of several of the preparatory schools throughout the Territory have reported a much larger attendance than previously. It is believed that this is in part due to the outlook for a higher education here at home for the young men and women who do not have the inclination or means to go to the mainland. The indications are, therefore, that for the next three or four years the entering classes will be much larger than heretofore, and that the proportion of those taking regular courses will be increased also.

While it would be desirable if all students entering the regular courses might remain to graduate, yet every facility is rendered those who find it possible and desirable to go to mainland colleges to complete their education. During the biennium several have gone with this aim in view and it is gratifying to note that in all instances credits have been granted for work done here. This would indicate that the College is complying with the requirements expressed in its Charter that "The standard of instruction in each course be equal to that given and required by similar institutions on the Mainland."

The first graduating exercises will take place in June, 1912. These exercises should be made the occasion of appropriate ceremonies commemorative of the establishment of this institution of higher education in the Territory.

During the present year the College has outlined a Course of Correspondence Study in the subjects of Soils and Crops, Plant

Life, Poultry Husbandry, Domestic Science and

EXTENSION Zoology. This is only the beginning of an ac-
DEPARTMENT tivity that should increase in importance. There

are those in the community who through exigencies of employment or residence cannot attend the College in person for either its regular or special courses. To these the Correspondence Study Department is appealing. When the College is established upon its permanent site and its facilities are otherwise increased other courses shall be added to this Department. The Department will also be enlarged to include movable schools and extension lectures and demonstrations on all subjects pertaining to rural affairs and industrial activities. During the biennium the College has through lectures, demonstrations and correspondence on subjects pertaining to its lines of work reached more than 600 people in Honolulu, Hilo Wailuku and other parts of the Islands. The movable schools conducted in Hilo and Wailuku during the summer of 1909 were not repeated because of a lack of funds, although requests were made for them.

THE WORK OF THE DEPARTMENTS

The activities of the various departments have been maintained along practically the same lines as during the previous years.

Though expansion is noted in all lines of work,

AGRICULTURE yet it is quite impossible to enlarge the scope of activities in the Department of Agriculture to the extent they should be until the grounds in Manoa Valley are put in fit shape, and crop and orchard plantings are made upon them. The completion of the poultry and dairy equipment will augment the facilities in Agriculture very much. By this equipment a number of new courses in subjects pertaining to Animal Husbandry and Dairy Industry will be arranged. Oppor-

tunities will also be provided for instruction in practical subjects for students not desiring to continue their studies for a degree. It is our desire to make it possible for any student who may be old enough and sufficiently in earnest to derive some benefit from the College, and the completion of this equipment will be an added opportunity in this direction.

Already considerable interest in Agriculture is manifested among the students. Four of the regular students are registered in this Department and thirty-two students are taking special work in some one or more of the branches of science or practice pertaining to this field of study. At the present time courses are offered in Agronomy, Horticulture, Poultry Husbandry and Dairy Industry. As soon as the College is removed to its permanent site in Manoa Valley and the land put in shape, much more practical work will be done in these subjects, and a wider variation of need for instruction can be met. Already four breeds of poultry have been secured for practical instruction and experiments in feeding and breeding. Three breeds of dairy cattle consisting of 1 bull and 3 cows each have been secured from some of the best herds in California and Washington; and it is planned that these may form a basis for better dairy herds in our community.

By the construction and equipment of the engineering laboratory the work of this Department has been considerably augmented.

The building has been equipped with suitable **ENGINEERING** hand and machine tools for thorough study in and practice with all classes of construction materials and their various phases of manipulation. The work of this Department is correlated in all of its phases to the end that students may be fitted gradually, as practical experience is acquired to assume those administrative responsibilities which are more and more devolving upon technically trained men.

The equipment in apparatus, machinery and illustrative material is not only serviceable and useful to the students actually in attendance at the College, but also to the community at large. Already valuable service has been rendered in connection with various industrial enterprises. A number of tests are in progress or have been completed on Ohia, Eucalyptus and other woods, Cements, Concretes, Bricks, Building stones and Iron and Steel. In all of

this commercial work the students take part and acquire valuable experience in addition to their regular classroom and laboratory work. All of these laboratories should in the near future be enlarged both to accomodate the present work as well as to provide for courses that must be provided for next year.

In Chemistry, Household Economics, Mathematics, Languages and other branches, progress has been made, and interest is developing. Both in the Departments of Chemistry and Horticulture, work has been done outside that of regular instruction. The Department of Chemistry has been helpful in the studies of local waters and soils and the Department of Horticulture has given considerable help in matters pertaining to fruit and vegetable culture and spraying.

OTHER DEPARTMENTS

LANDS

In accordance with Act 55 of the Session Laws of 1909, there has been procured for the College during the year two additional tracts of land; namely, the remainder of the Highland Park tract except block 1 and the Peterson tract. The former, including streets, comprises about thirty acres, and was purchased for the sum of Thirty Thousand Dollars (\$30,000.00). The latter comprises about 16.5 acres, and cost of Seventeen Thousand Two Hundred Fifty-one Dollars and Fifty Cents (\$17,251.50).

AREA

During the month of January, 1911, by a decision rendered in the Circuit Court and later by action taken by the Governor, the Puahia tract, which had previously been under lease, was formally transferred to the College for its permanent use. This tract is admirably adapted, and will be used for the work of crop and fruit production, soil management and irrigation. The land holdings of the College now amount to about ninety acres.

The acquisition of these additional lands is a marked asset to the College. It enables us from the beginning to arrange the College equipment and work in accordance with definite plans looking to their continuance in the future. This is an important consideration for one of the most marked features of similar Colleges and

PLANS

Universities on the Mainland is the lack of land area and of a definite plan for buildings and lines of work in the beginnings of their existence. Our environment of stream, hills, and arable land, to say nothing of the view and salubrious climate of the Valley, give opportunity for the establishment of a College that will be quite equal to any in the scope and character of its work. The plans that were drawn up about two years ago for the growth and beautifying of the campus have been carefully studied and there seems to be no tendency to make any material changes.

BUILDINGS

The Engineering Department has been partially provided for by the erection of a frame building 28x81 feet at a total cost of about Two Thousand Dollars (\$2,000.00). This

ENGINEERING building houses the machinery, tools and equipment for both wood, cement and metal technology, and apparatus for testing all construction materials. It does not, however, provide for the steam- and gas-engine equipment and the electrical equipment which must be provided for during the coming year. The building is built in such a way that it may be moved to the Manoa site, if it may seem desirable to do so, without much loss except to the concrete floor and other attachments.

The Chemistry laboratory was extended so as to provide hood and desk room for twelve students. The cost of this extension, amounted to about One Thousand Dollars (\$1,-

CHEMISTRY 000.00). By dividing the classes into sections those now taking Chemistry can be accommodated, but the capacity of the laboratory has about been reached.

Upon the approach of Halley's comet in January, a movement was started in Honolulu to raise a fund for the building of an observatory to house the astronomical equip-

OBSERVATORY ment already possessed by the College. There was raised by popular subscription \$1,434.50 for the purpose of erecting the building, and the Kaimuki Land Company donated one lot in their tract upon which the building is erected. The building houses the six-inch telescope, the three-inch transit, the precision clock and chronometers, and other parts of

the astronomical apparatus already in our possession. The building is located on the Waialae side of the Kaimuki ridge. This location was selected for the three reasons: that it was easily accessible; that this region has a very small percentage of cloudiness; and because from this point a broader sweep of the horizon can be secured than from any other locality enjoying the first two advantages in the same degree. During the period of the approach and recession of the comet, about two thousand people visited the observatory, and to a large number of these the equipment and process of astronomical observations were explained. Further equipment will be added as occasion and necessity demands.

In May, 1910, four thousand dollars was set aside from the Conservation portion of the Special Income Tax Fund. The amount will be expended for the construction and maintenance of a Dairy, Poultry, and Swine Experiment Station for the College. By the advantage of this appropriation some eight

acres of the College lands in Manoa Valley have been partially cleared, and four poultry runs with the necessary fencing, sheds and water supply, feed storage and laboratory has been erected. All of this has been done at a cost of a little more than seven hundred dollars. A dairy laboratory to accommodate fourteen cows, and to afford the necessary feed storage and laboratory facilities for the handling of the dairy products and for instruction purposes has been erected at a cost of Twenty-six Hundred Dollars. The best sanitary principles are embodied in the construction. All floors are of concrete and the stalls have pipe railings. Facilities for good ventilation and cleanliness are provided.

In proximity to this building a weather tower has been erected. Upon this tower will be placed the wind, sunshine and rain gauges, the barometers and thermometers. This equipment will be invaluable both for instruction in meteorology as well as for furnishing data upon which the management of soils and the production of crops may be based.

FUTURE PROJECTS

It is the province of the College to foster and promote lines of investigation and research as well as instruction. While in-

struction is the primary purpose of this College, yet, inasmuch as we are teaching the subjects of science in a way that demands knowledge at first hand, it is impossible to teach these subjects adequately before accurate knowledge, based upon fact and experience, is obtained. Our teaching should also be in accordance, as largely as may be, with the environment. The Tropics present a great many problems of inquiry and research, and especially is this true in Hawaii. Our climate, soil, biological and industrial conditions are different from those prevailing in the Temperate Zone, and oft-times the theories and practices of the Temperate Zone do not apply fully to the same projects in the Tropics. It is pertinent therefore that the College should engage in all lines of research and investigation that will promote those lines of instruction as well as add to the sum total of knowledge. So far as Agriculture is concerned, the development of our lands in Manoa Valley, will render adequate facilities for experimentation, and re-

search into the principles that underlie the practices of crop and animal production, and soil management. Provisions for this work should be hastened along as rapidly as possible for the full consummation of our plans of instruction cannot be accomplished until our lands are in shape, and adequate water supply provided. For the purpose of this development, the Legislature should provide funds sufficiently adequate to cover the cost of clearing the land, especially the Puahia tract, and some portions of the other property. For the development of the water supply, a dam should be built in the Manoa stream, of such size as to impound the flood waters that are constantly going to waste. Preliminary surveys have already been made, and it is estimated that a dam constructed in the proper place would impound about ninety acre-feet of water. This reservoir would be so located that almost the entire tract could receive water from it. In addition to the water supply, the dam should be so constructed as to afford every facility in the study of Hydraulic and Irrigation Engineering. The dam should incorporate the necessary spill-ways, sluices, weirs, standpipes, gates, etc., that are requisite for advanced instruction in the properties of water, its management and utilization. The development of these facilities is of paramount importance, because as at the

present time, the Agricultural resources of this Territory have been largely dependent upon water so in the future, with the development of new lands, water will be of even greater importance. With the increasing diversity of our products new problems will arise and with the homesteading of the land increased demand will be made for information pertaining to crop and animal production and soil and water management. The College should be prepared to further these movements. The College now possesses the natural facilities for one of the best institutions for Agriculture and the Mechanic Arts to be found anywhere in the country.

In order to render the astronomical equipment now possessed by the College more useful to the community, some steps should be taken to organize facilities for announcing the correct time. The College is already in possession of the necessary clocks and chronographs for this purpose. It remains to provide for electrical connections with the observatory and a time ball to be stationed in some suitable locality, near the center of the business activities and interests. If this convenience were installed, accurate time could be given to all interests in a manner that would be both attractive as well as eminently convenient and useful.

CORRECT TIME

A great deal has been said in recent months regarding the diversification of industries and the conservation of our natural resources. The establishment of a Marine Biological Laboratory as a branch of the Department of Zoology would be one means of accomplishing these objects. Every one is familiar with the present scarcity of edible fish existing in our waters, and we are also familiar with the high prices that are charged for those caught. At present there are no adequate regulations regarding the kind and size of fish that may be taken for market purposes, or the seasons when they should be left undisturbed for breeding purposes. Both of these are paramount questions if our fish supply is to be adequately maintained. In order to make recommendations on this question, there should be established a laboratory where the breeding habits and the problems pertaining to fish culture could be adequately studied. It is quite

MARINE LABORATORY

probable that if the College could make a beginning in this work, aid might be secured from the United States Fish Commission. At any rate, the whole question of our fisheries, both marine and fresh water, should be studied for the purpose of instruction as well as for the purpose of making recommendations for suitable laws pertaining to the conservation of this valuable resource.

In addition to the fishery question it is not improbable that our waters are quite suitable for the propagation of commercial sponges, pearls, certain types of corals, commercial seaweed foods and products and other marine products of commercial importance. Some attempts, I believe, have already been made to accomplish these objects, but, like many projects of this nature, trials were made without a knowledge of the conditions involved. Through the agency of a properly equipped Marine Biological Laboratory the conditions of food, enemies, temperature, light, shade, depth, etc., in their relation to the propagation of sponges, pearls, corals, and the like could be investigated. Upon the acquirement of sufficient knowledge in respect to these resources, recommendations could be made that might mean a saving of a great deal of energy, time, and expense, or, on the other hand, might result in commercial activities of great importance.

Hawaii is especially replete with problems relating to Hydraulic, Sanitary, Municipal and Mechanical Engineering. Every day questions arise concerning the properties
ENGINEERING and manipulation of structural material, the
EXPERIMENT use and application of electricity and water
STATION to various lines of industrial activity; and in many instances these problems are complicated by local conditions of climate and utility that do not apply elsewhere. In order to meet these needs there should be established in connection with the Engineering Department an Engineering Experiment Station. To consummate this plan more building room will be required for the housing of additional laboratory equipment. The Engineering Department is already equipped with considerable machinery and apparatus, but the floor space for installation and work is inadequate.

IMMEDIATE NEEDS

In the nature of the work and purpose of the College, it is necessary to project plans into the future and anticipate their consummation as facilities and demands develop. In order to meet this requirement at least part of the income of the College from Territorial sources should be in the form of a permanent endowment as is the case with its Federal income. In this connection it is pertinent to quote the recommendation of the legislative Committee appointed in 1905. In accordance with the usual procedure in the mainland states, the College of Hawaii may be endowed and supported (aside from Federal resources) in one or more of four different ways as follows:

- 1st. By land-grants, the income from which may accrue to the College.
- 2nd. By a tax levied for the support or maintenance of the College.
- 3rd. By a regular and cumulative appropriation in accordance with the growth and needs of the College.
- 4th. By special appropriations at each session of the Legislature to meet the needs of the College for the succeeding biennium.

Of these four means it seems that the first would be best suited to the needs of the College, and the income thus provided might be, when necessity arises, supplemented by appropriations for buildings and specific needs.

Following is a statement of the estimated needs and requirements of the College for the biennium, 1911-13.

For salaries and pay roll;

Administration	\$ 75.	monthly,	\$1800.	biennially
Librarian	75.	"	1800.	"
Stenographer	75.	"	1800.	"
German and French	150.	"	3600.	"
History and Economics	150.	"	3600.	"
Drawing	25.	"	600.	"
Janitor	40.	"	960.	"
Care taker (Manoa Valley)	40.	"	960.	"
				\$15120.

For expenses;		
Supplies, repairs, furniture, fixtures and incidentals		\$2400.
Correspondence Courses and Extension	\$50.	1200.
Labor	20.	480.
Moving buildings and equipment to Manoa Site		2500.
		<hr/> 6580.
For building and equipment;		
Main building as per plans, minimum estimates		60000.
Furniture and Fixtures for same.		10000.
Care taker's Cottage		1200.
For clearing and subduing lands.		5000.
		<hr/>
Total		\$97900

The College is in urgent need of a permanent building situated on the lands in Manoa Valley. The frame buildings now occupied are inadequate both as to room provided as well as to convenience. These buildings afford a floor area of 9900 square feet, and it is conservative to state that for present needs the area should be at least twice as large. Within three or four years the floor area that will be required for the College is estimated at four times what it is now. Then, too, the buildings should be located on the Manoa site as soon as possible for already activities are beginning there and it is not convenient to have the work of the College so far separated. In consideration of the position which the College occupies in the economic affairs of the Territory and its outlook for future usefulness, a building adequate in room and convenience should be built.

FINANCIAL STATEMENT

APPROPRIATIONS	Amount Available	Total Expnd.	Average Exp.	Balance
	Bien. Period 1909-1911	18 mos. End. Dec. 31, '10	per mo. 18 mos.	Dec. 31, '10
SALARIES, PAY ROLL AND EXPENSES \$15000.				
Totals		\$11794.54	\$655.26	\$3205.46
Postage, Stationary & Supplies.		443.52	24.92	
Buildings, Furniture & Fixtures		3120.55	173.36	
Labor and Repairs		291.39	16.19	
Sundries		873.36	48.52	
Salaries and Pay roll		7065.72	392.54	
DAIRY, POULTRY AND SWINE (CONSERVATION) APPR.				
MADE MAY 1, '10	4000.			
Totals		3201.26	177.85	798.74
Labor		296.40	16.47	
Buildings		2881.96	160.11	
Sundries		22.90	1.27	
FEDERAL FUNDS 108,912.53				
Totals		78082.64	4337.92	30829.89
Salaries		36139.59	2007.75	
Books & Illustrative Material ..		5272.17	292.90	
Apparatus		23825.12	1323.62	
Machinery		3883.16	215.73	
Supplies		5071.55	281.75	
Live Stock		3891.05	215.61	

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